BRAIN AND COGNITION 20, 217–226 (1992)

The Feeling of a Presence and Verbal Meaningfulness in Context of Temporal Lobe Function: Factor Analytic Verification of the Muses?

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We hypothesized that the feeling of a presence, particularly during periods of profound verbal creativity (reading or writing prose or poetry), is an endemic cognitive phenomenon. Factor analyses of 12 clusters of phenomenological experiences from 348 men and 520 women supported the hypothesis. We conclude that periods of intense meaningfulness (a likely correlate of enhanced burst–firing in the left hippocampal–amygdaloid complex and temporal lobe) allow access to nonverbal representations that are the right hemispheric equivalents of the sense of self; they are perceived as "a presence." The relevance of our results to the theories of Jaynes, Bear, Edelman, and MacLean is discussed. © 1992 Academic Press, Inc.

INTRODUCTION

The Muses of Greek mythology were considered entities that imbued artists, musicians, and writers with inspirations. During periods of intense, innovative productivity, an incorporeal entity or presence was supposed to have been detectable within the artist's perceptual field. The autobiographies of most creative thinkers, from science to religion, frequently refer to these "presences"; they are attributed with the cause of the thinker's insights, discoveries, and creativity.

One of the most common phenomenological correlates of creativity is the concomitant experience of profundity that is often attributed with mystical significance and "cosmic" authority. We reasoned that if the creative process facilitated the feeling of a presence, then normal people who report significant emotionality from reading and writing poetry or

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0278-2626/92 $5.00
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TABLE 1
MEANS AND STANDARD DEVIATIONS FOR THE 12 PHENOMENOLOGICAL CLUSTERS FOR MEN AND WOMEN; DIFFERENCES BETWEEN THE MEANS ARE INDICATED BY THE *F* VALUES

	Male		Female		
Cluster	M	SD	M	SD	*F* value
Psi experiences	34	25	40	27	11.48**
Limbic motor	35	24	36	25	0.65
Automatic behavior	35	23	35	26	0.20
Writing	18	25	37	31	84.06**
Verbal meaning	32	32	40	32	14.30**
Widened affect	44	26	48	26	4.75
Depersonalization	34	29	40	32	6.35*
Visual anomalies	19	23	19	24	0.23
Auditory-vibration	30	29	24	26	7.72*
Presence	19	27	21	27	0.89
Olfactory sense	15	19	17	21	2.75
Hypomania	35	30	37	29	1.12
		Additional cluster			
Female–male factor	52	17	31	21	124.87**

* $p < .01$
** $p < .001$

prose should also have had experiences of a sensed presence. The psychometric verification of this hypothesis would be the extraction of a factor that demonstrated a shared source of variance between both verbal profundity and feelings of a presence. The following analyses were designed to evaluate this prediction.

METHOD

Subjects. Three hundred forty-eight (348) men and 520 women served as subjects. They had been enrolled in either first or second year undergraduate psychology courses during a 10-year period. Their ages ranged from 18 to 65 years; the mean was 25 years.

Procedure. All subjects completed the Personal Philosophy Inventory (PPI) within 20 to 30 min during class periods that were reserved for testing (Persinger, 1984; Makarec & Persinger, 1990; Persinger & Makarec, 1991). The answers to the 140, yes/no (true–false) items were loaded, along with age and demographic information, onto a Vax 4000 computer. For this study, 12 phenomenological subclusters were utilized: psi experiences, limbic motor behavior, automatic responses, writing history, verbal meaning, widened affect, depersonalization, visualization, auditory–vibratory experiences, feelings of a presence, olfactory sensations, and hypomania.

The score for each subcluster, consisting of three or four items, was calculated by dividing the number of affirmative (or the equivalent) responses by the number of items in a cluster and multiplying by 100. A sample item from each of these clusters is shown in Appendix I while their means and standard deviations (for men and women separately) are shown in Table 1. The test–retest reliability for the aggregate of these clusters is 0.90 after 10 days and 0.70 after 100 days (Persinger & Makarec, 1987). Clusters of items that infer olfactory experiences, writing history, and hypomania were positively correlated with the (bipolar)

TABLE 2
CORRELATIONS BETWEEN EACH PHENOMENOLOGICAL CLUSTER AND THE DERIVED FACTORS (VARIMAX ROTATION) FOR MALES AND FEMALES

	Male			Female	
Cluster	Fac1	Fac2	Fac3	Fac1	Fac2
Eigenvalue:	(3.82)	(1.36)	(1.02)	(3.78)	(1.33)
	52% of variance			42% of variance	
Automa	0.68			0.56	
Visual	0.66			0.51	
Olfact	0.54			0.58	
Audvest	0.53	0.46		0.50	0.48
Limmot	0.52			—	
Wideaffec		0.77		0.64	
Hypoman		0.62		0.54	
Depers	0.47	0.59		0.72	
Psi		0.57		0.68	
Write			0.79		0.77
Verbmean			0.79		0.77
Presence			0.40		0.59

electroencephalographic variability in the duration of α rhythm activity over the temporal but not occipital lobes (Makarec & Persinger, 1985, 1990).

Factor analyses (PCA) of the 12 clusters were performed separately for the men and the women. Factor structures were interpreted only after varimax rotation; a significant loading of a cluster upon a factor required a correlation of $>.39$. The results dictated a second series of factor analyses for the men only in order to discern the degree to which a gender factor or a specific phenomenological theme facilitated the formation of the factor structure. All 12 clusters for those men who scored (1) most similarly ($n = 142$) to women on a 10-item scale (Persinger & Makarec, 1991) that accurately discriminated 85% of university men and women, (2) above 37% ($n = 206$) on the verbal meaning cluster, or (3) above 36% ($n = 270$) on the psi phenomena cluster, were factor analyzed separately. The selection of these subjects eliminated ($p > .05$) the statistically significant male–female differences for those measures. All analyses were completed using SPSSX software.

RESULTS

The results of the factor analyses indicated that both men and women display shared sources of variance for experiences that involved a preference for creative writing, the capacity to discern profound meaning from written material, and the feeling of a presence (Table 2). We called this shared source of variance the "Muse Factor". Its similarity was evident for both genders even though the factor structures that comprised the other clusters were dissimilar. Whereas the other cluster loaded upon only one factor for the women, two factors emerged for the men.

Additional factor analyses, after the selection for either the feminine factor (Persinger & Makarec, 1991) or the proclivity for psi experience,

significantly altered the structure of the Muse Factor for our male population. However the selection for the propensity for verbal meaning reinforced the loading of the feeling of a presence upon the Muse Factor. The factor loadings for each cluster became: writing (0.70), verbal meaning (0.67), and feeling of a presence (0.59); these loadings were not significantly different (*t*-test for coefficients) from those of normal women.

DISCUSSION

The results of this study suggest that the report of some type of "presence" or "entity" originates from the same source of variance as the capacity to experience enhanced verbal meaningfulness. It is the type of linguistic affect that is evoked when prose and poetry are read or written. Our analyses suggest that the Muse Factor, which has been evoked metaphorically in many cultures to explain creativity and literary insight, is not unique to professional poets, writers, or artists. Like the occurrence of temporal lobe signs (Makarec & Persinger, 1985; Persinger & Makarec, in press), the factor is simply more intense or exaggerated within these populations.

Although both men and women displayed the same factor structure, the weighting of the cluster that referred to feeling a presence was stronger for women. Our subsequent analyses indicated that this gender difference is related to the stronger propensity to experience verbal meaningfulness by women relative to men. When only men (about 40% of the males) whose scores for verbal meaningfulness were comparable to average women had been selected, the loading of the feeling of a presence cluster upon the Muse Factor was almost identical to that of normal women. That the effect is a correlate of verbal meaningfulness and not of either traditional sex-role differences or the capacity to experience or to report psi (strange) experiences was demonstrated by the fragmentation of the Muse factor when only those men were selected who did not differ ($p > .05$) from women on either our psi experience or androgyny scales.

We interpret these results as support for our hypothesis that the sense of ("conscious") self in the average human being is associated with a specific pattern of electrical activity within the deep mesiobasal (hippocampus and amygdala) structures and adjacent cortical regions of the left temporal lobe. This hypothesis is compatible with the concept, developed by Edelman (1989) and MacLean (1990), that the sense of individuality requires the simultaneous interaction of internal (limbic-mediated) with external (cortically-mediated) information. In effect, the sense of human self requires the presence of a memory capacity that contains symbolic or language sequences and their internal (image-based) representations. Environments that enhance the convergence facilitate the "sensed presence" as defined by Suedfeld and Mocellin (1987).

We suspect that both the necessary condition and the neurophysiological

substrate for the feeling of a presence depend upon the intrinsic properties of burst firing. This essential role of burst-firing within aggregates of neurons within the mesiobasal portions of the temporal lobes is suggested by the enhanced incidence of this phenomenon during ictal states (with which the feeling of a presence is frequent) in limbic epileptic patients (Isokawa-Akesson, Wilson, & Babb, 1987). In addition, a very similar pattern occurs in normal individuals, nightly, during dream sleep (Stevens, 1982) when incorporeal entities are frequently "encountered." Similar but weaker sensations have been evoked experimentally by the external application of burst-firing-like electromagnetic fields through the head along the temporal plane (Ruttan, Persinger, & Koren, 1990; Persinger et al., 1991).

That our clusters of phenomenological experiences reflect enhanced temporal lobe functions has been supported by several validation experiments. We (Persinger, 1983, 1987; Persinger & Makarec, 1987; Persinger & Valliant, 1985) have pursued the hypothesis that a continuum of temporal lobe lability or sensitivity exists along which all human beings are distributed; the neurophysiological correlate of this continuum would be defined by the number of synchronously firing neurons (size of the aggregates) within subcortical limbic regions and the areas of the neocortices that are affected.

The extreme end of this continuum would be dominated by people who display limbic (complex partial) epilepsy while the intermediate regions would be occupied by the highly creative individuals engaged in art, music, literature, and the theater. At the opposite end, below the range occupied by the average person, we should expect to find individuals who might be diagnosed as alexithymic. The concept is a logical extrapolation of David Bear's (1979; 1986) description of sensory-limbic hyperconnectionism and is empirically supported by the positive association between the intensification of phenomenological experiences and the numbers of synchronously discharging units within aggregates of amygdaloid-hippocampal neurons (Babb, Wilson, & Isokawa, 1987).

Stated alternatively, the continuum hypothesis argues that normal people *should* display phenomenological experiences that are similar to but less intense than those reported by limbic epileptics during surgical stimulation (Gloor et al., 1982; Horowtiz & Adams, 1970) or autoactivation of electrically active foci (Goldensohn, 1983). These experiences include "the feeling of a presence," widening of affect, a sense of the personal (enhanced egocentric importance), psi-like experiences, anxiety or fear, profound meaningfulness, and cosmic/religious sensations; the latter are often not discussed or reported in the scientific literature (Dewhurst & Beard, 1970).

The neuropsychological validity of the clusters analyzed in the present study have been supported as well. Normal people who reported greater

numbers of temporal lobe signs and symptoms also showed greater variability in the duration of α rhythm appearance (our measure of limbic lability in the normal person) over the temporal lobes but not over the occipital lobes (Makarec & Persinger, 1985; 1990). Delayed cross-modal (stereognosis-to-vision) matching is facilitated in people with enhanced scores on clusters that infer amygdaloid activation (Sabourin & Persinger, 1987). This effect is (expected and) opposite to the loss of cross-modal matching that is produced by lesions of this mesiobasal region (Murray & Miskin, 1985).

The most parsimonious explanation for the loading of profound verbal meaningfulness and the feeling of a presence upon the same factor requires the existence of some right hemispheric equivalence of the sense of self. During periods of enhanced limbic activity, phenomenologically experienced as intense meaningfulness about the self in context of space and time, a concomitant increase in the access to right temporal lobe processes occurs; the homologous equivalent of the sense of self individuality is experienced as a non-specific "presence".

The necessary limbic activity would be encouraged by poetry and prose because of their strong semantic affect and the novel and unusual combinations of words; the latter are known to evoke the type of large electrical potentials within the human hippocampal formation and amygdala (Halgren et al., 1980) that could recruit the "critical mass" required for discharges to access the right temporal lobe. However, other stimulus patterns, especially repetitive strings of words (such as meditation) or motoric rituals (dancing) could encourage the critical discharge.

The initiation of this right hemispheric "self" would be evoked after the enhanced burst-firing within the left mesiobasal structures spread through indirect, brain stem pathways (Lieb et al., 1987) to the right amygdaloid–hippocampal complex and from here into the other (homologous) right hemispheric structures. Two suggested routes have been through the midline thalamic nuclei or the midbrain reticular formation rather than through the hippocampal commissure of the corpus callosum. If this sequence is correct then the experience of sudden understanding and cosmic meaningfulness concerning the self in context of space–time should normally be followed within 20 to 30 sec by the sense of a presence; this latency has been documented for the spread of paroxysmal activity from one amygdala to the other through brain stem pathways (Lieb et al., 1987).

At that moment of bilateral activation an altered state, similar to but less intense than complex partial epileptic forms (Babb et al., 1987) of clouding of consciousness with a sense of ego-alien intrusion, could occur and would represent the oceanic and transcendental states of creativity (Landon & Fischer, 1970; Rossi, 1986; Budzynski, 1986). The intrusive quality of the experience would be sufficient to attribute it to "outside

of the self" due to normal inferential processing (Hoffman, 1986); because of the amygdaloid involvement and learned explanations for these experiences, the content or "message" would be considered cosmically significant and authoritative.

If indirect brain stem pathways are required for the interhemispheric discharges, as described by Lieb et. al (1987), then the normal diurnal oscillations of arousal should modulate these experiences. This process might explain why feelings of presence most frequently occur nocturnally, especially between 0200 to 0400 hr in the morning (Persinger, 1974, 1988) and during twilight states of consciousness (Evans, 1984). Recent, very meaningful personal events that encourage ACTH (Adrenocorticotrophic hormone)-induced, burst-firing within limbic structures would precipitate the feeling of a presence during these normal alterations in arousal (Persinger, 1985, 1988).

This interpretation is similar to Julian Jaynes' (1976) theoretical development of the origin of consciousness in the break-down of the bicameral mind. From his perspective right temporal lobe activity was attributed to "gods" or to other sensed presences while the left temporal lobe involved sequential symbolic or language activity. During periods when consciousness was significantly altered, such as during literary or musical creativity, the bicameral characteristics partially emerged again. In secular men and women, the right hemispheric (ego-intrusive) phenomenology might be reported as a presence, entity, or force while in religious men and women the same process might be reported as a spirit, angel, or culture–specific god. The hedonistic polarity (pleasure–pain; euphoria–fear) would have determined the value label for the experience (good vs. bad) and the attribution of its source (heaven vs. hell).

Historically the feeling of a presence has been attributed to gods or god surrogates such as spirit guides or extraterrestrial entities (Evans, 1984). Our results suggest that people who have emphasized writing and the pursuit of the understanding of the self through verbal, ruminative processing, have been particularly prone to the feeling of a presence. This may explain why the tradition of literary scholarship has been paired with prolific arguments about the personal proofs of the existence of supernatural entities (Evans, 1984). In light of (1) the implicit verbal chains between the self, space–time, and both the concept and anticipation of personal death (Persinger, 1987) and (2) the general indicators that left hemispheric processes subserve positive affect, the popularity and persistence of these arguments are understandable.

Such correlation between poetic/prose writing and feeling of a presence would also accommodate the common belief that sacred literatures were inspired because of the "presence" of the culture-specific entity that imbued the writers with wisdom during their creations. As suggested by the increased incidence of "deep reflection" and hyperreligiosity in patients

with electrical foci within the left temporal lobes (Bear, 1986), the historical obsession with periods of profound prose writing and the existence of gods may be an artifact of the fundamental neuropsychological process that couples profound verbal meaningfulness and the sense of a presence.

The experience of a "presence" during periods of profound semantic meaningfulness has frequently been interpreted as irrefutable proof that the "message" or "insight" is derived from ego-alien (Hoffman, 1986) or cosmic sources. As observed in both the histories of religious movements (Persinger, 1987, 1989) and individual revelations, the experiences permanently alter people's beliefs concerning "truth" and the rationale by which they interact with other human beings. We suggest that the coupling between profound semantic meaningfulness and the sensed presence might be a focus for further study.

APPENDIX I

A list of the 12 phenomenological clusters and a sample item within each cluster (each contains 3–4 items) follows:

Cluster	Sample Item
Psi experiences	An inner voice has told me where to find something and it was actually there.
Limbic motor	When I get upset or angry, my legs feel weak.
Automatic Behavior	People tell me that I blank out sometimes when we are talking.
Writing	After writing prose or poetry, I feel better.
Verbal meaning	When I am alone or feel really low, reciting poetry or prose is a pleasant experience.
Widened affect	When I have a tough decision to make a sign will be given and I will know what to do.
Depersonalization	I have experiences when I feel as if I were somewhere else.
Visual anomalies	There have been times when I have stared at an object and it appeared larger and larger.
Auditory vibrations	While sitting quietly I have had uplifting sensations as if I were driving quickly over a rolling road.
Presence	At least once in my life, very late at night I have felt the presence of another Being.
Olfactory signs	At least once a month I experience intense smells that do not have an obvious source.
Hypomania	Sometimes I am so full of pep and energy that I feel superhuman.

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